Accommodating the Needs of Students with Environmental Sensitivities

A Report for School Boards, Parents and Educators

AEHA Allergy and Environmental Health Association of Canada

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by

Elizabeth Stutt and
Leslirae Rotor

for the

Allergy and Environmental Health Association of Canada

Forewords by

The Lung Association
Learning Disabilities Association of Canada
Doris J. Rapp, M.D.
Canadian Society for Environmental Medicine
Jozef J. Krop, M.D.
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Cover illustration: Linda Phillips.
Technical assistance for the oral presentation and covers: Brian Acres.
Editing: Sue Johnston.
Computer keyboarding, design and layout: Elizabeth Stutt.

We wish to thank the following organizations and persons for granting their permission for us to quote from their publications or articles:
American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc.
Dr. Warren E. Hathaway
Health Canada
Dr. Doris J. Rapp
Bruce M. Small
United States Environmental Protection Agency
Irene Wilkenfeld

January 1996.

Printed on Recycled Paper.

Acknowledgements

The authors wish to thank the other members of the AEHA National Education Committee (Brian Acres, Catherine Acres, Doris Coté, Kathy Dickinson, Madeleine Lapointe and Judy Martin); Joanna Anderson, AEHA (National) Resource Librarian; Margaret Kelly, AEHA New Brunswick Branch; Helen Lofgren, AEHA Nova Scotia Branch; Nora Schallhorn, AEHA Waterloo-Wellington Branch; Ed Lowans, AEHA National Past President; Dr. J.G. Maclennan, AEHA Honorary Medical Advisor; Ian Morton, The Lung Association; Barbara McElgunn, Learning Disabilities Association of Canada; Dr. L.M. Marshall, President, Canadian Society for Environmental Medicine; Dr. Jozef J. Krop, Secretary, Canadian Society for Environmental Medicine; Dr. Doris J. Rapp, Past President, American Academy of Environmental Medicine; and Ruth Taber, Team Leader, Provincial Schools Branch, Ontario Ministry of Education and Training for their valuable contribution to this student information package. We also wish to acknowledge and thank Stephanie Wells for the original design and typesetting of the brochure.

We would also like to thank the many interested parents across Canada who encouraged us to proceed with this student information package, which includes a brochure, the artwork for transparencies as well as the text for an oral presentation, and this report. We hope that this material will provide you with the direction and information you need in order to make environmental changes in your schools for the benefit of all students and staff.

Elizabeth Stutt and
Leslirae Rotor, B.Math, M.Sc., M.A.

Learning Disabilities Association of Canada

Children with environmental sensitivities have been called *"The canaries in the coal mine"* — an early warning system for others inhabiting the same environment. Exposures to building products, furnishings and materials that have toxic potential, as well as poor ventilation in schools, affect all children to some degree. For example, unventilated rooms, with lower levels of oxygen and higher levels of carbon dioxide, result in a sleepy and restless class.

It is becoming more and more evident that the central nervous system is particularly vulnerable to exposures to many toxicants and that these can affect both learning and behavioural abilities in subtle but serious ways. However, studies to investigate the potential of most volatile organic compounds (VOCs) to adversely affect the brain have not been done, and so we have no data upon which to base a reference concentration for inhaled air for children's exposures to these substances.

A study of workers exposed to VOCs (found in a variety of industrial and home products, including paints, varnishes, glues and cleaning agents) compared these workers to unexposed workers on a battery of neurobehavioural tests. The exposed workers performed significantly more poorly on tests of learning and memory, visuospatial skills, attention and mental flexibility, and motor speed and dexterity.[1]

We do not know how many children are affected by poor school ventilation and toxic exposure, but as Health Canada's ISSUES paper on environmental sensitivities states: *"Prevention is the most important and simplest aspect of this problem."*[2] Removing allergens and/or sources of contaminants in schools could help all children.

An optimal learning environment is much more than a good curriculum and good teaching. It would be prudent for school boards to institute the recommendations of the Allergy and Environmental Health Association into policy and procedure.

Barbara McElgunn
Health Liaison Officer
Learning Disabilities Association of Canada

Foreword from The Lung Association

On behalf of The Lung Association, I want to commend you on the production of *Accommodating the Needs of Students with Environmental Sensitivities.* Long overdue, it underscores the need to increase awareness about the link between our indoor environment and health.

I also hope it stimulates discussion regarding the need for enforceable regulations within indoor environments. In many indoor settings, little if any legislation exists to regulate the use of toxic compounds or to set exposure limits especially for at-risk populations such as expectant mothers, children, seniors and the infirm. In addition, eight ministries address indoor air quality issues — more if federal and municipal levels are included. Each ministry has different responsibilities and degrees of involvement, but none has a clear mandate to regulate or remediate indoor air quality problems.

Clearly a comprehensive education program like yours is the first step to assist people in identifying, avoiding and remedying indoor air quality problems in the school environment. While the costs of this agenda may be considerable, the costs of inaction, both in terms of health and financial liability, could greatly exceed those of an early, responsible campaign.

Congratulations on an excellent information package!

Ian C. Morton
Environment Co-ordinator
The Lung Association

Doris J. Rapp, M.D.

It is certainly fortunate for Canadian students and teachers that the Allergy and Environmental Health Association has prepared this educational material to address the Environmental, Health and Learning connection. Too many continue to ignore or deny the obvious. What we eat, touch, and breathe unquestionably can affect how we look, feel, act, behave, learn and remember. Missing this relationship will definitely jeopardize the future of some children.

Many affected children and their families have classical allergies such as asthma, hayfever or eczema which commonly in turn lead to repeated ear, nose, sinus, lung and skin infections. Dusts, molds, pollen, pets, and foods, however, are only part of the environmental picture. Our chemically polluted environment can adversely affect any area of the body. Typical allergenic substances, as well as chemicals, can cause headaches, muscle twitches, tics, weakness and cramps. Bladder or bowel spasms can cause accidents in school, blood vessel problems can cause nosebleeds, and an immense variety of activity and behaviour problems can be related to school exposures. Finding, eliminating or treating the causes of these problems will result in these children feeling, learning, and behaving considerably better. Not recognizing these problems can naturally lead to secondary psychological stresses, but this is usually the effect, and not the cause. The challenge is to detect and eliminate as many of the environmental factors as possible that are interfering with a child's well-being.

Parents and educators, as well as older children, must jointly accept the responsibility of recognizing when environmental factors interfere with learning. Working as a team, they can uncover the cause of many problems and then find practical and sensible ways to cope with them.

Many of the suggestions made in this presentation are not really difficult. The bottom line is to think about what the child ate, touched or smelled. If a child is ill mainly at home and better at school, think about what might be different within your home. If there are problems at school home and the child is better at home, think about what might be different within the entire school. Think particularly about poor ventilation or molds. If a child is worse in one special room or area, ask yourself why? What is different in that location? If worse after meals, snacks or parties, think about foods and beverages. If worse after cleaning, remodeling, new furnishings, exposure to lavatory disinfectants, or science laboratories, think chemicals. If a child is worse on rainy days or in damp areas, think mold. If a child is worse outside during recess, think of pollen, mold, or pollutants, such as pesticides. In relation to all of this, remember, it is not *"how much but how sensitive"* that determines if someone will become ill or not. Some sensitive individuals, for example, can become amazingly ill from the slightest whiff of a wide range of chemical odours.

The required changes in a school are not always expensive. Sometimes one or more of the following can totally resolve a child's problem: better ventilation with fans, filters and open windows; a room air purifier; safer cleaning agents; fewer chemicals; and avoidance of a favourite food. Resolution of the cause of an environmentally related illness in one child will undoubtedly help many others in that school who are less seriously or less obviously ill. Unfortunately, we presently live in a world of contaminated air, food, water, clothing, homes, workplaces and schools. By also applying the proposed general suggestions discussed in this presentation to the home environment, a child's improvement should be even more remarkable.

This information package fortunately provides some insight and answers that hopefully will enable caring parents, teachers and school administrators to unite in their efforts to restore and monitor the health and academic ability of their students.

Doris J. Rapp, M.D., F.A.A.A., F.A.A.P.
Pediatric Allergist Specializing in Environmental Medicine (Buffalo, NY), and author of five books on this subject, including *Is This Your Child?* and *Is This Your School?* (forthcoming in September 1996)

Canadian Society for Environmental Medicine

It is indeed impressive that the Allergy and Environmental Health Association (AEHA) has tackled the important task of raising parent, teacher, and school board awareness of the adverse and sometimes devastating health effects of indoor air pollution in schools.

It is also even more commendable that they have developed such excellent educational materials. This report, a brochure, and the text for an oral presentation are all clear, concise and attractive. They offer maximum information with minimum exertion.

The observed health effects of exposure to environmental contaminants are outlined. The suggested environmental control measures offer sensible means to prevent or minimize illness in the hypersensitives and to protect **all** students and school staff. After all, it is possible that **any** individual attending polluted schools may eventually develop environmental hypersensitivity disorders or other health problems. Thus, preventative measures designed for some are actually protective for all.

Our physician members have repeatedly seen significant health improvements in hypersensitive students and teachers after application of reasonable environmental control measures in their schools. The AEHA materials offer very useful guidance to pursue such measures.

L.M. Marshall, M.D., F.A.A.E.M.
President, Canadian Society for Environmental Medicine

Jozef J. Krop, M.D.

Problems in our schools are increasing: violence, behavioural disturbances and learning disabilities. Educators and parents should be aware that chemicals in the environment affect not only the physical but also the psychological health of our children.

Low-level exposure to toxins in our daily life via chemicals in the food chain, air, water and unsafe building materials contaminate both body and mind. Pollution stress creates a need for detoxification achieved through nutrients (vitamins, minerals and amino acids) not always available due to the degradation of agricultural soil and the excessive marketing of junk foods targeted particularly at children.

Poor nutrition negatively affects both bodily structure and function particularly that of the central nervous system. Our genetic DNA code, identical to that of our ancestors dictates how to build and regenerate our bodies. The building blocks are the nutrients available from foods but today's blocks are of poor quality. Compare this to building a home according to sound architectural plans (DNA) but using cheap materials (today's diet). The end result is a nice looking house (body) vulnerable to damage (infections, etc.).

Neurobehavioural toxicology proves that toxins in small doses can damage the brain and more so developing brains of children, causing confusion, depression, anger, memory loss and decreased intellectual functioning. Integrity, identity and sovereignty are maintained through an adequate supply of nutrients supporting psychological processes. A calculator with a weak battery can perform only simple functions. A polluted brain, by analogy, performs the basic functions of maintaining breathing, circulation, instincts of hunger and sex, but higher functions such as learning, love, friendship and sharing are distorted.

This report is important for all students, educators and parents. The offered suggestions should be put into practice not only in schools, but in our homes and workplaces as well.

Jozef J. Krop, M.D., F.A.A.E.M.
Secretary, Canadian Society for Environmental Medicine, and
Board Member, American Academy of Environmental Medicine

J.G. Maclennan, M.D

This report educates society, by explaining the relationship of different environmental exposures to student health.

Those of us who have practiced Environmental medicine for many years have identified an increasing incidence of environmental sensitivities in our pediatric patients. The chemicals that are responsible are derived from fossil fuels, natural gas, oil and coal. they are found in the air we breathe, the foods and fluids we consume, and are all foreign to the human body. Another significant cause of environmental illness is sensitivity to particulate inhalants, such as molds, mold spores, dusts, mites pollens, pets and foods

Although all parameters of the environment can cause adverse reactions in the sensitive individual, chemicals are the most difficult to detect and manage, because they are so numerous. Likewise, any organ system in the body can be affected, and therefore the manifestations are varied and diverse in nature. It is our experience that the brain and central nervous system are a common site of reaction, causing symptoms that make life very difficult for the student, teacher and class as a whole. This, of course, effectively prevents the student from developing good study habits, learning and progressing through the school grades and university to achieve full potential as a student and adult.

Because of their size, children have a higher metabolic rate, relatively greater lung capacity, increased respiration and pulse rate. Being of shorter stature, their exposures are greater because the concentrations of chemicals are higher at floor level than at adult height. In addition, children's immune mechanisms do not mature until they are 10 to 12 years of age.

This report offers a comprehensive, common-sense, corrective, and preventive program for school boards across Canada. It is cost effective from an economic and health point of view, and following this program will ensure that our children will reach their potential, according to their individual capabilities.

J.G. Maclennan, B.A., M.D., F.A.C.A., F.A.A.E.M.
Honorary Medical Advisor, Allergy and Environmental Health Association of Canada

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A Report for School Boards, Parents and Educators

Introduction

Teach your children what we have taught our children.
That the Earth is our Mother.
Whatever befalls the Earth, befalls the sons of the Earth.
Man did not weave the web of life.
He is merely a strand in it.
Whatever he does to the web, he does to himself.

Chief Seattle (1854).

Allergy and Environmental Health Association

Who are we?

Our goal

The Allergy and Environmental Health Association (AEHA) is a national, self-help, registered charity, operated by volunteers, with branches across Canada. Together we strive to:

- Hold meetings and workshops for mutual support and education.
- Publish national and branch newsletters with information on:
  - Allergies, environmental sensitivities and related health issues;
  - Product information and sources;
  - Recommendations for healthy living;
  - National and local activities; and
  - Environmental concerns.
- Provide information on tolerated sources of food, water, clothing, personal and home care products, home furnishings and building materials.
- Promote awareness among individuals, communities, schools, corporations and governments of environmental conditions harmful to human and global health.

Our goal in this document is to improve the environment of learning. Indoor air quality, lighting, electromagnetic radiation, temperature and humidity all affect learning. It is hoped that sharing our experience will help school boards ensure clean, safe environments for all students and staff.

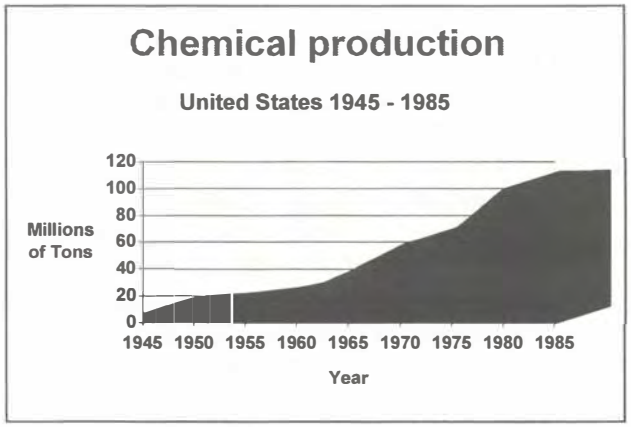
The Environment of Learning

How school boards can help

It is conservatively estimated that at least 15 per cent of our population have been sensitized to environmental agents and experience associated reactions.

People with environmental sensitivities suffer often disabling reactions to substances in our air, water and food at levels that are presently considered acceptable for the general population. Heightened rates of off-gassing of volatile organic compounds from many building materials currently in use in newly constructed and remodelled facilities are particularly problematic. Indoor environments affect human health, behaviour and learning ability.[3]

A growing number of this population have asthma, with many of the new cases being young children who react adversely to environmental pollutants.



Note: the data for this graph was taken from Ashford and Miller's *Chemical Exposures: Low Levels and High Stakes.*

Childhood asthma affects 10–12 per cent of Canadian children, with 80 per cent of them being young children. Asthma is the principal cause of school absences attributable to chronic diseases in childhood, accounting for 20 per cent of school days lost in elementary and high schools. Acute asthma is the most common medical emergency in children and is responsible for increasing death rates.[4]

In 1989, there were over 34,000 admissions to Canadian hospitals for the treatment of asthma in children under 15 years of age. In that year on an average day, hospitals admitted more than 93 children for the treatment of asthma. The increasing annual costs of asthma in Canada passed the $600 million mark by 1990.[5]

Children are *"especially susceptible to air pollution"* according to the United States Environmental Protection Agency:

> *"The same concentration of pollutants will result in a higher body burden in children than adults because children breathe a greater volume of air relative to their body weight. For this and other reasons, air quality in schools is of particular concern.*[6]

In addition, children's immature detoxification systems are much less able to eliminate these contaminants.

Ventilation

ASHRAE Standard 62-1989

accepts adverse health effects for

20%

of a healthy adult population

One of the benchmarks used to assess indoor air quality in our schools — *ASHRAE Standard 62–1989*[7] — is based on the premise that 20 per cent of a healthy adult population will react adversely at the levels set by the standard. These standards are inadequate for children with environmental sensitivities and probably for the general population of school children as well since children are far more sensitive than adults to contaminants.

Many children are presently missing school days because of inadequate environments in our schools. Failing to provide good indoor environments in our schools means that some children lack equal access to programs and services. If we fail to accommodate those with environmental sensitivities in our schools, we also isolate them socially.

Toxins / Irritants / Sensitizers

- **Pesticides, bactericides, herbicides and fungicides**
- **Pets, plants**
- **Bacteria, fungi, molds, dusts and dust mites**
- **Electromagnetic radiation**
- **Volatile organic compounds (VOCs)**
- **Fuels**
- **Building materials containing VOCs, including carpets**
- **Paints, waxes and cleaning products**
- **Lead, radon, asbestos**

Indoor air pollution is a serious environmental health problem since people spend over 90 per cent of their time indoors.[8] Contaminants can be up to 100 per cent higher indoors.[9] The World Health Organization estimates that 30 per cent of homes and buildings today contain enough indoor pollutants to cause health affects that range from a sniffle to more serious health problems.

"Environmental sensitivity should be considered as a possible contributing factor in a learning or behavioural exceptionality."

Marion Boyd
Ontario Minister of Education, 1991

Both former Ontario Ministers of Education Marion Boyd and Tony Silipo have supported the need for alternative learning environments for students with environmental sensitivities.

In summary, it is important that we protect the quality of our environment. The persons served by school boards — children — are the most vulnerable group in society and our country's most important resource. School boards must address the needs of all children, including those with environmental sensitivities, such as asthma, allergies and multiple chemical sensitivities.

Chapter 1:
What Are Environmental Sensitivities?

Environmental sensitivities

- **Many common things can cause adverse reactions**
- **Avoidance is the best treatment**

A growing segment of the population experiences a variety of adverse reactions to environmental agents at levels well below those that might be deemed to affect average persons. This atypical reactivity is called environmental sensitivities. Subsections of environmental sensitivities include labels descriptive of the site of the reaction such as "asthma" (lungs), the mechanism of the reaction such as "allergy", or the causative agents such as "multiple chemical sensitivities" or "electromagnetic sensitivity". The medical profession refers to this condition as environmental hypersensitivity disorder (EHD).

Environmental hypersensitivity has been defined as:

> *"... a chronic (i.e., continuing for more than three months) multisystem disorder, usually involving symptoms of the central nervous system and at least one other system. Affected persons are frequently intolerant to some foods and they react adversely to some chemicals and to environmental agents, singly or in combination, at levels generally tolerated by the majority.... Improvement is associated with avoidance of suspected agents and symptoms recur with re-exposure."* [10]

Some agents that may act as triggers:

- Agents, either naturally occurring or synthetic, in our air, water, food, personal and home care products, fabrics, furnishings; hospital, school and office equipment, office supplies and building materials; chemicals used or stored in the home, health care facilities, schools, workplaces, farms or industries and public transportation vehicles; pollens (grass, trees, plants, weeds), dusts, molds and animal danders.
- Artificial lighting and electromagnetic fields.

Chemical sensitivities can develop in individuals of any age regardless of whether they have a past history of allergies. The severity of symptoms can range from mild discomfort to total disability or chronic health problems. Symptoms may develop suddenly or slowly.

Environmental sensitivities are often degenerative. Prevention, early detection and treatment are therefore of paramount importance. Treatment of environmental sensitivities focuses on prevention, ***prudent avoidance of offending agents,*** appropriate nutrition, supportive counselling and medical interventions.

Some of the Dr. Jekyll and Mr. Hyde behavioural signs and symptoms of sensitivities include the following:

Behavioural signs and symptoms

- **Hyperactive**
- **Irritable**
- **Aggressive**
- **Drowsiness**
- **Depression**
- **Poor concentration**
- **Underactive**
- **Indifferent**
- **Passive**
- **Distractible**
- **Inconsistent**
- **Too focused (appears not to hear)**

Some of the physical signs and symptoms that may present include the following:

Physical signs and symptoms

- Headaches
- Rubbing eyes
- Red or watery eyes
- Bags or dark circles under eyes
- Red ears or ear lobes
- Earaches
- Nasal salute
- Stuffy, runny nose
- Frequent "colds"
- Mouth breathing
- Coughing, wheezing, asthma
- Throat clearing
- Stomach aches, diarrhea
- Eczema, hives, rashes

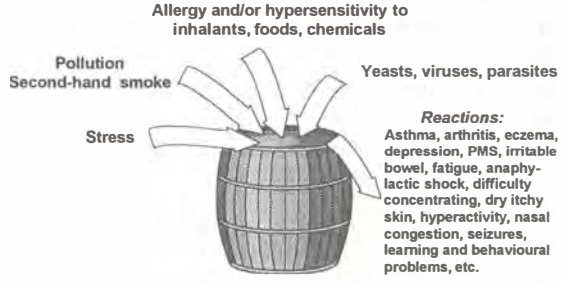
Physical signs

- **Central nervous system (including brain)** — headaches, extreme tiredness, dizziness, fainting, mood swings, confusion, depression, hyperactivity, memory problems, loss of co-ordination, seizures.
- **Systemic reactions** — anaphylactic shock.
- **Eyes** — infected, itchy, red, watery or puffy, visual problems.
- **Ears, nose and throat** — frequent infections; itching, ringing ears, red earlobes; sneezing, itchy, irritated, blocked, runny or stuffy nose, "allergic salute" (pushing nose up with palm of hand); irritated, hoarse throat, laryngitis.
- **Mouth** — metallic taste, dryness, cracking, excessive saliva, skin peeling or blistering.
- **Lungs** — infected, coughing, wheezing, tightness, breathing difficulties, asthma.
- **Skin** — cold, itchy, cracked, red, bruised or swollen; hives, rashes, eczema.
- **Muscles, bones and joints** — stiffness, aches, pain, weakness, swelling, muscle cramps, "arthritic" symptoms.
- **Digestive system** — nausea, cramps, bloating, gas, diarrhea or constipation, irritation, food cravings, weight loss or gain.
- **Urinary and reproductive systems** — cramps, infections, itching, burning, urinary urgency or frequency.

Such problems make it very difficult to obtain an education. The barrel in the following illustration represents the total body burden a person can tolerate. Reactivity increases as the barrel fills, peaking when the barrel overflows. Thus the aim is to remove or reduce the stressors and triggers as much as possible.

Hypersensitivity is not synonymous with hyperactivity. Many children will become hypoactive (lethargic, withdrawn, etc.). They are less likely to be identified since they are not a problem to adults or other students. Some may experience alternating hyper/hypo periods.

The "body burden" concept



- The barrel represents the total body burden a person can tolerate.
- Reactions occur or worsen when the barrel is full.
- Thus, the aim is to remove or reduce the stressors and triggers as much as possible.

Sensitivities affect each individual differently. Symptoms may be mild and merely annoying, or they can be severe enough to interfere with daily activities, family life and career. Severe sensitivity is called "hypersensitivity" and can be fatal.

It is essential that parents and schools work together to find the best possible environment for the individual student with environmental sensitivities.

Chapter 2:

Environmental Sensitivities and Schools: Some Excerpts from the Literature

Environmental Hazards In Your School: A Resource Handbook by the United States Environmental Protection Agency, 1990.

WHY BE CONCERNED WITH INDOOR AIR QUALITY?

Background

It is common to think of air pollution solely in terms of outdoor pollution. However, in the 1970s and 1980s, EPA conducted several studies to determine individuals' total exposure to air contaminants from both indoor and outdoor sources. From these studies we learned that concentrations of important contaminants were often 2-5 times higher indoors than outdoors. Since most individuals spend over 90% of their time indoors, it is clear that indoor pollution is an important environmental health problem.

Higher energy costs encourage the development of tight buildings and a reduction in the amount of outdoor air brought into schools for ventilation. In addition, building operating and maintenance budgets are often reduced to minimal levels, particularly in schools. These actions, combined with the proliferation of indoor sources of contaminants — synthetic materials, cleaning agents, pesticides, printing and copying devices, combustion and humidification appliances, tobacco products, and other sources — reduce the quality of indoor air environments and consequently the health and comfort of building occupants.

Building sickness in schools

A building is characterized as "sick" when its occupants complain of health and comfort problems that can be related to working or being in the building. Problems associated with sick buildings are "sick building syndrome", in which the cause or causes of symptoms are not known; or "building related illness", in which an illness can be traced to a specific cause, such as Legionnaire's disease. Complaints can include headache, nausea, lethargy, eye, nose and throat irritation, difficulty in concentration, and similar symptoms. Many school buildings throughout the country have been affected, sometimes requiring temporary relocation or school closings.

From investigations of these buildings and from other studies, it is clear that the problem is often not traceable to a single source or a single contaminant, but rather to multiple problems in the design, construction, operation or maintenance of buildings. Studies also suggest that the problem is not limited to clear situations of episodic illness, but can result in decreased health, comfort, and productivity, for which poor indoor air quality may not be an obvious cause.

....

WHAT CAUSES INDOOR AIR QUALITY PROBLEMS IN SCHOOLS?

Important factors which affect the quality of the air in schools are:

(1) indoor chemical sources of contaminants;

(2) failure of the ventilation system to adequately dilute contaminants with outdoor air, to exhaust contaminant sources, to deliver ventilation air to the breathing zone of the occupants, or to maintain proper temperature and humidity conditions;

(3) air brought into the building which is contaminated from outdoor sources, particularly those close to the building's air intake vents; and

(4) the presence of microbial contaminants which proliferate in humid or wet environments.

"Recommendations for Action on Pollution and Education in Toronto: A Report" by Bruce M. Small, Small and Associates, Goodwood, Ontario, 1985.

The conclusion to this report states:

a. that polluted indoor and outdoor air can make some people sick
b. that many specific indoor and outdoor pollutants have been shown to be potential hazards for at least some people, including:
   - nitrogen and sulphur dioxides
   - exhaust fumes including carbon monoxide
   - fibrous materials such as asbestos
   - tobacco smoke
   - polychlorinated biphenyls
   - various pesticides and herbicides
   - lead, cadmium, mercury and aluminum
   - methanol
   - formaldehyde [see page 8 of this report]
   - assorted volatile hydrocarbons [see page 8 of this report]
   - biological agents (viruses, fungi, bacteria)
   - inhalant allergens (mold, dusts, danders)
c. that there is a wide range of vulnerability to pollutants among the population, and that sensitive individuals can be adversely affected at exposure levels below toxic limits
d. that the number of people who can be badly affected by indoor and outdoor pollutants is not known, but is sufficiently large that there may be some in every school
e. that some pollutant exposures can render an otherwise healthy person hypersensitive to chemical exposures
f. that other events can also trigger an increased susceptibility to pollutants (e.g., viral infection, yeast infection)
g. that many common pollutants are potentially neurotoxic, and may affect behaviour and learning
h. that many materials and activities in schools, including renovation, can cause sufficiently high pollution levels to adversely affect at least some staff and students, including:
   - tobacco smoking
   - painting
   - use of pest control products
   - science and industrial training activities
   - art materials
   - faulty heating systems
   - cleaning products
   - office copiers, especially methanol copiers
   - floor coverings
   - perfumes
i. that inadequate ventilation of areas with multiple pollution sources can lead to unacceptable conditions
j. that numerous other factors can also adversely affect behaviour and performance, including:
   - nutritional deficiencies
   - food allergy
   - noise
   - light and other electromagnetic radiation
   - temperature and humidity
   - psychological stress
k. the bottom line:
   Can pollution affect health, behaviour and learning?
   YES.

"Lessons in Unclean Air: Sick Schools Pose Certain Risk — Why is sick building syndrome now common in schools?" by Irene Wilkenfeld, *Indoor Pollution Law Report,* Vol. 6, No. 4 (1992).

... virtually no attention has been focused on the environmental school factors that may trigger hypersensitivity reactions and have an adverse affect on a child's ability to learn. And, until school-based environmental insults are substantially curtailed, our nation's youngsters will continue to fall short of our educational goals.

The World Health Organization (WHO) estimates that about 30 percent of the nation's [US] schools have indoor air quality problems and are suffering from the sick school syndrome. The figure may be even higher for newly constructed or remodelled facilities.

***Is This Your Child?: Discovering and Treating Unrecognized Allergies* by Doris J. Rapp, M.D. (New York: William Morrow and Company, Inc., 1991), Tables 13.5, 13.3 and 13.4, respectively (pp. 286–287, 280 and 284–285).**

Sources of Formaldehyde

Adhesives
Air pollution, i.e., industry
Antifreezes
Beverages, beer, wine
Burning of gas, oil, wood, coal, kerosene, diesel fuel
Carpets, carpet pads
Cleaning solutions, detergents, laundry starches
Clothing: polyester, artificial silk
Construction adhesives
Cosmetics, mouthwash, toothpaste, deodorants, nail polish, nail hardeners, shampoos
Disinfectants, bactericides, fungicides, germicides, deodorizers (room or air)
Dry-cleaning compounds
Embalming fluids
Explosives
Exterior plywood, fabric dyes
Fabrics: wrinkleproof, water-resistant, dye-fast, flame-resistant, moth-resistant, shrinkproof, elastic
Fertilizers
Furniture cabinets
Gas appliances
Gelatin capsules
Hair-growing products, hair-setting lotions
Household waxes, oils
Inks
Insect repellents, pesticides, rodent poison
Jute or hemp fiber preservative (carpet backing, burlap, area rugs, rope, twine)
Laminating materials
Leather tanning agents
Maple syrup (some varieties)
Newsprint
Paints, finger paints, enamels, tempera paints, lacquers, varnish removers, wood preservatives, wood stains, wood veneers
Particleboard, chipboard, interior plywood, wood paneling
Perfume
Pharmaceuticals
Phenol formaldehyde resin
Photographic chemicals and film
Plaster, stucco, wallboard, concrete, Bakelite, cellophane
Plastics, plastic cleaners
Shoe polish
Tissues (facial), toilet paper
Tobacco smoke, tobacco
Upholstery fabrics and finishes (permanent press, water-repellent, dye-fast, flame-resistant, water-resistant, shrinkproof, mothproof, mildewproof)
Upholstery foam
Urea formaldehyde foam insulation (UFFI), glass-fiber insulation
Vitamin E and A preparations [some]
Wallpaper [most]
Wines

Sources of Hydrocarbons

Coal and petroleum products, including solids, liquids and gases
Solids: a whole array of plastics, synthetic fabrics, roof tar, asphalt, wax coatings (used to coat some fruit and vegetables)
Liquids: gasoline, diesel, and oil. (Industry uses a huge number of related petrochemicals.)
Gases: natural and bottled gas; fumes from any of the hydrocarbon solids or liquids; odor from cleaning compounds, polishes, paints, insecticides; evaporating oil from an electric motor
Auto and bus exhaust
Chemicals used in copying and duplicating machines
Art and decorating supplies
Treated papers and adhesives
Pine wood and turpentine (can affect people sensitive to hydrocarbons since coal, oil, and gas all developed from organic material)
Disinfectant cleaning solutions

Sources of Phenol

Acne medications
Adhesives, glue
Aerosols used as disinfectants for odor or mold control
Allergy extract preservative in traditional allergy extract treatments
Aspirin
Bakelite
Baking powders
Caulking agents
Detergents
Disinfectants (pine)
Dyes
Epoxy and phenolic resins
Explosives
Fiberglas
Flame-retardant finishes
Food additives
Inks: fountain pen, printers, stamp pads
Insulation: thermal and acoustical
Jute or hemp fiber preservative: carpet backing, area rugs, rope, twine
Laundry starches
Matches
Metal polishes
Mildew, mildew-proofing
Molded-plastic articles, such as telephones and toys
Mouthwashes
Nylon
Paints: enamel paint, tempera paint, watercolor paints
Perfume
Pesticides and herbicides
Pharmaceuticals
Phenolic plastics, such as hard saucepan handles
Photographic chemicals
Plastics
Plywood
Polyurethane
Preservatives in cosmetics: mascara, liquid eye liner, cream rouges, and eye shadows
Preservatives in hair care products: hair spray, setting lotion, shampoo, hair color
Preservatives in medication: nose and throat sprays, bronchial mists, cough syrups, eye drops, antihistamines, cold capsules, decongestants, first-aid ointments
Shaving cream and lotions
Shoe polishes
Spandex: girdles, support hose, etc.
Synthetic detergents
Synthetic fabrics
Tin cans (inner lining)
Tobacco smoke
Wood preservatives, sealants, solvents

Chapter 3:

How Can a Parent Help A Child with Environmental Sensitivities?

What parents can do

- **Have your child assessed for environmental sensitivities**
- **Seek support and information**
- **Make lifestyle changes**
  - **eat tolerated food**
  - **use tolerated water**
  - **avoid pets, if necessary**
  - **use tolerated cleaning and laundry products**
  - **dust and vacuum more often**

If you suspect that your child may be experiencing adverse reactions:

- Have your child assessed for environmental sensitivities by a physician specializing in environmental medicine.
- Join a support group for persons with environmental sensitivities, such as the Allergy and Environmental Health Association (see Appendix B).
- Modify your lifestyle and home environment:
  - Avoid foods which cause adverse reactions.
  - Use tolerated water for drinking and cooking.
  - Determine if pets are a contributing factor. If so, address the problem.
  - Use tolerated, non-odorous, unscented, non-toxic, volatile-organic-compound-free, environmentally appropriate cleaning and laundry products.
  - Dust and vacuum more often.
  - Reduce chemical exposures (including the removal of synthetic carpeting, particularly from your child's bedroom).
  - Eliminate the use of scented personal care, laundry and cleaning products.
  - Establish your home as a smoke- and scent-free environment.
  - Use appropriate pesticides (borax) and bactericides (benzalkonium chloride and hydrogen peroxide) with appropriate caution.
  - Check tolerability before introducing new building materials.
  - Avoid products which contain volatile organic compounds.
- Communicate openly with your child's teacher, principal and, if necessary, the school board administration with respect to your child's needs at school.
- Provide the school with a written health record with all pertinent information. This information should be retained on the student's record for ready access by all staff, as needed.
- Refer to publications (see Bibliography) such as: *Is This Your Child?* by Doris J. Rapp and *Non-Toxic, Natural and Earthwise: How to Protect Yourself and Your Family From Harmful Products and Live in Harmony With the Earth* by Debra Lynn Dadd.

What parents can do 2)

- ***lifestyle, cont.***
  - **reduce chemical exposures**
  - **have a smoke- and scent-free home**
  - **use tolerated products**
  - **use safe renovation products**
  - **reduce VOCs**
- **Communicate with teacher and school board staff**

Chapter 4:

How Can a Teacher Help Students with Environmental Sensitivities?

What teachers can do

- **Be aware that sensitivities are individualistic and variable**
- **Be aware of student needs**
- **Engage in open 2-way communication**
- **Know emergency procedures**
- **Respect special diets**
- **Remove known allergens**
- **Use unscented products**

- Recognize that sensitivities are highly individualistic and variable.
- Check with the student and the student's parents before bringing new substances into the classroom.
- Promote open communication with parents and students.
- Review the student's health needs as presented by both the parents and the student's physician.
- Learn the necessary emergency procedures for your student's reactions (to such things as bee stings, foods, chemical vapours, etc.).
- Respect the need for special diets (no food substitutions or rewards, or have alternative food rewards available).
- Recognize that foods and even food aromas can trigger health and emotional stresses for children with environmental sensitivities.
- Avoid known allergens or triggers such as chalk dust, pets, plants and volatile organic compounds. Whiteboards and flipcharts may be used with water-based markers as alternatives to chalkboards.
- Avoid the use of perfume, after-shave, or other scented personal care products, such as cosmetics, hair sprays or gels.
- Be aware that smoke-laden clothing may cause problems for some sensitive students. Air dry-cleaned clothing well before wearing. Use unscented laundry detergent and avoid **all** fabric softeners.
- Avoid the use of materials that emit volatile organic compounds, such as solvent-based felt markers, certain art materials and typing correction fluid. Refer to *The Safer Arts* for alternative products.
- Avoid the use of dittos and other solvent-based reproduction processes.
- Seat sensitive students near a window for natural light and ventilation.
- Avoid having plants, soil, terrariums, composters and vermicomposters, etc., inside the classroom.
- Provide suitable textbooks: neither brand new because of off-gassing from ink, paper or glue nor too old because of molds, dust and mites.
- Respect the need for alternative learning environments particularly for subjects such as chemistry, biology, computers, family studies, industrial arts and auto mechanics.

What teachers can do

(2)

- **Use unscented laundry detergent without fabric softeners**
- **Use art supplies not containing VOCs**
- **Use alternatives to dittos**
- **Use water-based markers**
- **Provide seating near windows**
- **Provide tolerated textbooks**
- **Provide alternative learning environments**

Chapter 5:
How Can a School Board Help Students with Environmental Sensitivities?

Adopt Board policies and procedures in consultation with representatives of persons with environmental sensitivities, to accommodate the needs of students with environmental sensitivities within the home school whenever possible and communicate these policies and procedures throughout your Board and to all of your schools.

Develop a communication link with an agency such as the Allergy and Environmental Health Association — preferably by granting a seat on your Special Education Advisory Committee and other relevant committees such as an indoor air quality committee or environment committee. It is advisable that the Health and Safety Officer sit on the Special Education Advisory Committee.

Improve the indoor environment in schools by addressing the following areas of concern:

General (for all students)

1. **Communication**
   - Encourage open two-way communications between parents and staff.
   - Review the student's health needs.
   - Arrange a team conference to include all of the student's teachers and the student's parents to ensure that everyone is aware of the student's needs.
   - Notify substitute teachers of the needs of sensitive students. The Student Record (kept in school office) and teacher's daybook should include the needs of students. The person responsible for substitute teachers should be given the appropriate information to ensure that substitute teachers are aware of the special needs with respect to personal care products and clothing.
   - Involve all staff, students and the public health nurse in the **environmental learning process** through publications, inservice workshops, attendance at conferences, etc.

2. **Smoking and scented products**
   - Establish a no-smoking policy on school property, as well as on buses, on and off duty.
   - Establish a no-scent policy on school property, as well as on buses, on and off duty:
     - A "no scent" policy includes perfume, cologne, after-shave and scented personal care products, including deodorant, shampoos, hair sprays and gels, soaps, laundry detergents, fabric softeners, etc.

No Scents makes Good Sense

Avoid:

- **perfume**
- **cologne**
- **after-shave**
- **scented personal care products (most are)**
- **scented soaps (most are)**
- **scented laundry detergents (most are)**
- **ALL fabric softener**

3. **Biocide policy (e.g., bactericides, fungicides, herbicides and pesticides)**
   - Eliminate the use of synthetic bactericides, fungicides, herbicides and pesticides. Use alternative pest management strategies[11] and safer

products such as borax, benzalkonium chloride and hydrogen peroxide.

- Prepare a policy and procedures manual listing safe products and techniques and ensure that the procedures are enforced. The Toronto Board of Education and the Halton Board of Education have done a considerable amount of work in this area.

Ventilation systems

- **Upgrade and maintain ventilation systems**
- **Provide direct source exhaust for all pollutant sources**

4. Ventilation systems and openable windows

- Upgrade heating and ventilation systems to satisfy either the most stringent air quality standards or those necessary to meet the needs of sensitive students, whichever are higher. Clean and maintain these systems regularly.
- Improve fresh air intake and air filtration systems. Locate air intakes upwind and away from building exhaust vents, and away from tarred roofs and bus-loading zones. Choose appropriate air filtration materials and ventilation systems; check for the tolerability of these materials with each affected student or staff member with environmental sensitivities.
- Provide direct exhaust to the outside from all contaminant sources, such as photocopy and laminating rooms, chemistry and biology laboratories, artrooms, computers, printers and fax machines, storage rooms, change rooms, cloak rooms, kitchens, washrooms, etc.
- Locate industrial art shops, auto shops, science laboratories and artrooms in efficiently vapour-sealed, negative-pressure classrooms, with separate ventilation systems or, preferably, locate them in separate buildings.
- Install automatic-closure doors on all rooms containing the contaminant sources listed above.
- Provide openable windows in all classrooms.

Openable windows in all classrooms

- **Reassign windowless classrooms for non-student uses**
- **Maximize the use of windows for natural light and fresh air in new and retrofit projects**
- **All students and staff benefit significantly from fresh air and natural light**

5. Proximity to power line corridors

- Locate schools away from power line corridors. Schools and their school yards and sports fields should not be located under or near transformers, power line corridors or overhead power lines.[12]

6. Lighting

- Classrooms without windows should be retrofitted with either openable windows or skylights and heat recovery ventilators; if retrofits are not possible, re-assign the classrooms for non-student uses.
- Maximize the use of windows in classrooms (return to the standard of a full wall of windows from at least the three-foot level to ceiling level).

- Ensure that each classroom has a minimum of four openable windows (two high, two low).
- Use near or full spectrum lighting and install low-harmonic electronic ballasts.
- Install multiple light dimable controls in classrooms to permit the maximum use of natural light and the minimum use of artificial lighting.
- Install vertical blinds, preferably aluminum.

7. Building materials and furnishings

- Avoid "building in" problems when renovating or constructing new schools. Increasingly, better tolerated building materials are becoming available on the market. Canada Mortgage and Housing Corporation (CMHC) is continually updating information on air quality, safer building materials and construction/ renovation practices.[13]
- Use maintenance and renovation practices which minimize the use of volatile organic compounds (such as solvents).

  Use building materials and furnishings that either do not off-gas or do so minimally and have been aired out off-site. For example, when building or renovating schools or when buying new furniture, avoid materials such as composite board products that off-gas at high levels for many years.

  If materials or furnishings continue to off-gas after installation, apply a tolerated sealant. Use flooring for which off-gassing is more manageable, such as terrazzo, ceramic, hardwood and some hard vinyl tiles and do not apply sealants, waxes, etc. Select adhesives and finishes for their tolerability and to minimize volatile organic compounds. Avoid carpeting and sheet vinyl due to their usual and significant off-gassing.
- Establish a mandatory off-gassing period for new construction and renovation projects. Use extra ventilation and increased temperatures while buildings are empty to accelerate off-gassing; this is known as a "bake out" protocol.

Floor coverings

- **Establish a no-carpeting policy**
- **Use smooth, non-porous and preferably seamless flooring throughout all schools for replacement and new construction projects**

8. Carpets

- Establish a "no carpet" policy for new construction and renovation projects.

  If carpets are absolutely necessary, use low-mass or natural options for limited applications such as for mobility disabilities. Carpets are a major source of indoor air pollution in our schools. Most carpets off-gas many toxic chemicals. Carpets act as a sink for contaminants in an indoor environment meaning that they continually adsorb and desorb contaminants. Carpets become a breeding ground for molds, dust mites and bacteria, and they are a trap for dusts. Use smooth, non-porous preferably seamless flooring as a substitute for carpeting. In kindergarten classrooms, use washable cotton throw rugs or towels as an alternative to wall-to-wall carpeting.

  A recent comparative study[14] indicates that substantial savings can be achieved, when installation and maintenance costs are considered, by using smooth flooring rather than carpeting.

  In their study, " **Norbäck** and **Torgén**[15] indicated that:

"The wall-to-wall carpet group reported an overfrequency of eye and airway symptoms, rashes in the face, headache, abnormal tiredness and a sensation of being electrostatically charged in comparison with personnel in schools with hard floor covering."

A few of the chemicals found in carpets

- 4-PC
- Styrene
- Toluene
- Alkanes
- 2,6-Di-t-butyl-4-methyl-phenol (BHT)
- Caprolactam
- Chlorinated butadiene
- Chlorinated cyclohexene
- Chlorinated butadienes
- C_9-alkyl benzene
- 2-Ethyl-1-hexanol
- Bis(2-ethylhexyl)-phthalate
- Hexamethylcyclotetrasiloxane
- Isobutyl hexadecanoate
- Isobutyl octadecanoate
- Methyl chloroform
- 2-Methyl-2,4-pentanediol
- 1,1'-Methylene bis-(4-isocyantobenzene)
- Octamethylcyclotetrasiloxane
- Propyl octadecanoate
- Triethyl phosphate
- Xylenes

Originally, schools installed carpets because of the belief that they contributed to the learning environment. However, current research indicates that that they contribute to ill health and impaired learning ability. In order to help children with environmental sensitivities, it is necessary to reduce the **overall load** of contaminants to which they are exposed.

The **cheapest single method** of reducing this load is to remove carpeting.

A policy of no new carpeting in schools will benefit all children and teachers, both now and in the future.

Maintenance and renovations

- **Schedule maintenance and renovation projects to minimize exposures**
- **Avoid construction, renovation and maintenance problems**

9. Building maintenance and renovation

- Use readily available zero-VOC water-borne paints.
- Use zero-VOC epoxy paints for special applications.
- Air out products before delivery to designated school. Specify open packaging if cross contamination is unlikely.
- Schedule painting, heavy maintenance and renovation projects during July, with appropriate ventilation and exhaust. This will maximize off-gassing. Schools that also house day-care centres or run summer school classes will require alternative strategies to protect the children, such as moving them to alternate locations.
- Use exhaust fans, heating and other procedures to facilitate off-gassing of new materials before the children recommence school.

10. Cleaning and maintenance products and procedures

- Use non-odorous, unscented, zero-VOC, non-toxic cleaning and maintenance products.
- Eliminate any cleaning product whose Material Safety Data Sheet requires the use of protective equipment including

safety goggles and rubber gloves, extra ventilation or special product dumping precautions.

Cleaning and maintenance products

- **Use unscented, tolerable, non-toxic cleaning and maintenance products, such as baking soda and diluted vinegar**

- Eliminate any product to which a student or staff member reacts.
- Eliminate the use of all waxes. Use sealants only where necessary to contain volatile organic compounds.
- Dust and vacuum daily [protocol using a HEPA (high efficiency particulate arrestor) vacuum and a static or damp mop].
- Air classrooms thoroughly after cleaning.

No-waxing policy

11. Portables/portapac classrooms

- Eliminate portables and portapac classrooms or develop appropriate standards to ensure that they are built in such a way that they do not off-gas.
- If portables and portapac classrooms are used, provide adequate ventilation underneath these structures to reduce mold contamination.
- Assign students with environmental sensitivities to non-portable/non-portapac classrooms.

Contact Canada Mortgage and Housing Corporation (CMHC) regarding information gained from the development of CMHC's modular Research House for the Environmentally Hypersensitive[16]. The information gained from the development of this housing unit could be adapted to design more tolerable portable classrooms with appropriate ventilation systems.

12. Transportation

- Provide suitable transportation in gas-powered vehicles (not diesel, propane or natural gas) that are at least two years old.
- Ensure that bus drivers are non-smokers and use unscented personal care products.
- Ensure that vehicles are cleaned with non-odorous, unscented, zero-VOC, non-toxic cleaning products.
- Establish a board policy to ensure that buses do not run or idle while awaiting students.

Action plan for sensitive students

- **Improve indoor air quality**
- **Additional accommodations for sensitive students include:**
  - **suitable classroom location**
  - **carpet-free classrooms**
  - **openable windows**
  - **tolerable furniture and textbooks**
  - **low EMF equipment or computer shields**
  - **tolerable transportation**
- **Educate all staff, supply teachers and students**

Specific Accommodations for Sensitive Students

- Recognize that sensitivities vary significantly. What one sensitive individual tolerates another may not. Also recognize that the same individual's tolerances will vary from one day to the next depending on exposure profile/history.
- Check with the student and the student's parents before bringing new substances into the school.
- Assign sensitive students to a classroom within the main school building, not in portable or portapac classrooms.
- Assign sensitive students to carpet-free classrooms.
- Provide openable windows for sufficient natural light and fresh air.
- Provide furniture that is at least two years old. Combination desk-chair units reduce noise irritation. Use tolerated sealants when off-gassing persists from furniture that is more than two years old.
- Provide suitable textbooks: neither brand new because of off-gassing from ink, paper or glue nor too old because of molds, dusts and mites.
- Use tolerated non-volatile cleaning and maintenance products.
- Dust and vacuum daily (protocol using a HEPA vacuum and static or damp mop).
- Air classrooms after cleaning.
- Provide low EMF computers.
- Provide sufficient fresh air to classrooms and laboratories and efficient external exhaust venting hoods for laboratories, family studies classrooms, computer labs, etc.
- Provide transportation in a tolerated vehicle with a non-smoking driver.

Conclusion

Environmental agents can affect:

- **learning**
- **health**
- **behaviour**
- **concentration**
- **attention**
- **vision**

Providing clean classrooms for students with environmental sensitivities will improve their ability to learn, attend and behave, and will also help them on their journey to wellness. Moreover, changes made to accommodate the needs of students with environmental sensitivities will benefit all students and staff by providing improved school environments. As well, the improved air quality will help to prevent the development of environmental sensitivities in other students and staff.

By working together, educators and parents can make a difference!

End Notes

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[2] Health and Welfare Canada, Health Protection Branch, "Environmental Sensitivities", *Issues,* December 23, 1991.

[3] Bruce M. Small, "Recommendations for Action on Pollution and Education in Toronto: A Report Prepared for the Pollution and Education Review Group of the Board of Education for the City of Toronto", a consultation paper, May 1985, pp. 56 and 57. For a reproduction of the referenced text, see page 7 of this report.

[4] Canadian Lung Association, *Lung Facts* (Ottawa: 1991).

[5] *Ibid.*

[6] United States Environmental Protection Agency, *Environmental Hazards In Your School: A Resource Handbook* (Publication # 2DT–2001, October 1990) (Washington, DC 20460), p. 13.

[7] American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., *ASHRAE STANDARD 62–1989: Ventilation for Acceptable Indoor Air Quality* (1791 Tullie Circle, NE, Atlanta, GA 30329).

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[9] *Ibid.* R.W. Bell, *et al., The 1990 Toronto Personal Exposure Pilot (PEP) Study* (Toronto: Queen's Printer for Ontario, 1991), p. 11. Gerald H. Ross, M.D., "The Environmental Control Unit in the Diagnosis of Chemical Sensitivity and Recent Findings of Neurotoxic Abnormalities on Brain Spect Imaging of Patients with Chemical Sensitivity", presentation to the Allergy and Environmental Health Association, Halifax, June 3, 1995.

[10] Judge George M. Thomson, *Report of the Ad Hoc Committee on Environmental Hypersensitivity Disorders* (Toronto: 1985).

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[12] Hathaway, Warren E., Ph.D., "Radiation Effects: Implications for educational facility planning", *The Canadian School Executive,* December 1991, pp. 3–9.

[13] Canada Mortgage and Housing Corporation, *Building Materials for the Environmentally Hypersensitive* (Ottawa: forthcoming). See also United States Environmental Protection Agency *et al., Building Air Quality: A Guide for Building Owners and Facility Managers* (Washington, DC: Superintendent of Documents, December 1991).

[14] Mary Oetzel, Environmental Education and Health Services, Inc., "School Districts Pay a High Price for Carpeting" (3202 West Anderson Lane, #208–249, Austin, TX 78757).

[15] Dan Norbäck and Margareta Torgén, "A Longitudinal Study of Symptoms Associated with Wall-to-Wall Carpets and Electrostatical Charge in Swedish School Buildings", *Indoor Air Quality '87: Proceedings of the ASHRAE Conference, Arlington, Virginia, May 18–20, 1987* (Vol. 2), pp. 572–576.

[16] Canada Mortgage and Housing Corporation, *Research House for the Environmentally Hypersensitive: Description and Technical Details* (Ottawa: November 1994).

Appendix A:
School Observation and Environmental Assessment Form

Name and address of school: _____

Principal: _____ Date of assessment: _____

Issues to be addressed/assessed:

1. School built in 19_____; last renovations to school in 19_____. Description of renovations: _____

2. Number of portables/portapacs ____. Willing to assign a sensitive student to a non-portable/portapac placement? Y ☐ N ☐

3. Heating/Cooling: electric ☐ gas ☐ oil ☐ heat pump ☐ air-conditioning ☐
   hot water radiator ☐ other (please specify) _____

4. Types of flooring used in school (check all that apply): terrazzo ☐ hardwood ☐ vinyl ☐ carpeting ☐ rubber (gym) ☐ other (please specify) _____
   Specify classrooms where carpeting is currently in use: _____
   _____

5. At least two (2) openable windows in all classrooms: Y ☐ N ☐ If no, what percentage lack windows? _____
   Window coverings: vertical blinds ☐ venetian blinds ☐ drapes ☐ other _____
   Lighting (check all that apply): low-harmonic electronic ballast ☐ fluorescent ☐ full-spectrum fluorescent ☐ incandescent ☐ other (please specify) _____

6. Ventilation: heat recovery ventilator (HRV) Y ☐ N ☐
   Direct outdoor exhaust from contaminant sources: photocopy machines ☐ computer labs ☐ science labs ☐ biology labs ☐ family studies (stoves, laundry) ☐ industrial arts (woodwork, metal work, etc.) ☐ automechanics lab ☐ artroom ☐ storage/janitorial ☐ changerooms ☐ swimming pool ☐

7. Are there negative-pressure controls and automatic-closure doors on rooms with contaminant sources? Y ☐ N ☐

8. Are bus bays located away from the building's ventilation air intake? Y ☐ N ☐ away from windows? Y ☐ N ☐

9. Is the school located near a power line corridor/transformer? Y ☐ N ☐
   At what distance? _____ m

10. Are the playgrounds and/or sports fields under/near power lines? Y ☐ N ☐
    Near main roads? Y ☐ N ☐

11. Computers: are low EMF computers or radiation protection screens provided? Y ☐ N ☐

12. Painting: date school last painted _____ Types of paints used? _____
    Date designated classroom last painted? _____

13. Has the school building experienced a flood(s) in the past? Y ☐ N ☐ If yes, please specify the year(s) _____ and the location of the flood(s) _____
    Describe methods used to eliminate molds. _____

14. Cleaning and maintenance products used [please specify and provide Material Safety Data Sheets as well as samples — please use extra sheet(s)]

Appendix B:
List of Associations

Organizations Representing Persons with Environmental Sensitivities

Allergy and Environmental Health Association (AEHA) /Association Allergies, Santé et Environnement (AASE)
46 Hwy #8
Dundas, ON L9H 4V3
Branches: British Columbia, New Brunswick, Nova Scotia and Ontario.
(905) 628-8241
Fax: (905) 628-4314
Contact: Dr. John D. Maclennan

H.E.L.P. Saskatchewan (branch of H.E.A.L.)
15 Olson Place, Regina, SK S4S 2J6
Contact: Paule Hjertaas

Other National Organizations

Allergy Foundation of Canada
Fondation du Canada des allergies (1974)
P.O. Box 1904, Saskatoon, SK S7K 2S5
(306) 373-7591
Contact: Sandy Woynarski

Allergy / Asthma Information Association
750 - 30 Eglinton Avenue West
Mississauga, ON L5A 3E7
Chapters: British Columbia, Manitoba, New Brunswick, Ontario, Quebec and Yukon Territory.
(905) 712-AAIA, fax: (905) 712-2245
Contact: Susan Daglish

Asthma Society of Canada
P.O. Box 213, Station K
Toronto, ON M4P 2G5
(416) 977-9684
Contact: Elizabeth Kovac

Canada Housing Information Centre (CHIC)
Canada Mortgage and Housing Corporation
700 Montreal Road, Ottawa, ON K1A 0P7
Regional offices in every province and territory.
(613) 748-2367

Canadian Lung Association
1900 City Park Drive, Suite 508
Blair Business Park, Gloucester, ON K1J 1A3
Chapters: Alberta, British Columbia, Manitoba, New Brunswick, Nova Scotia, Ontario, Prince Edward Island, Quebec, Saskatchewan and Yukon Territory.
(613) 747-6776, fax: (613) 747-7430
Contact: Robert Marks

Canadian Society for Environmental Medicine
P.O. Box 62058, Convent Glen Postal Outlet
Orleans, ON K1C 7H8
(613) 235-1440

Canadian Centre for Occupational Health and Safety
250 Main Street E., Hamilton, ON L8N 1H6
1-800-263-8276

Associations by Province

Alberta

Alberta Association for Environmental Health
16 McKerrell Close S.E., Calgary, AB T2Z 1M7
(403) 257-1102
Contact: Linda Seifert

Alberta Lung Association
Box 4500, Edmonton, AB T6E 6K2
(403) 492-0354, fax: (403) 492-0362
Contact: Gary Lathan

Society for Environmental Health and Housing
Box 74, Site 22, R.R. #12
Calgary, AB T3E 6W3
(403) 240-2494
Contact: Ethel Patrick

British Columbia

Allergy and Environmental Health Association (Victoria Branch) (also known as Ecological Health Alliance)
1019 Lodge Avenue, Victoria, BC V8X 3B1
(604) 384-8892
Contact: Katy Young

Allergy / Asthma Information Association
202 - 1620 West 8th Avenue
Vancouver, BC V6J 1V4
(604) 731-9884
Contact: Lynda Kerr

British Columbia Lung Association
2675 Oak Street, Vancouver, BC V6H 2K2
(604) 731-5864, fax: (604) 731-5810
Contact: Scott McDonald

Manitoba

Allergy / Asthma Information Association
Prairies / NWT Regional Office
106 - 600 Better Street
Winnipeg, MB R2Y 2H7
(204) 837-2137
Contact: Margaret Irvine

Manitoba Lung Association
629 McDermot Avenue, 2nd Floor
Winnipeg, MN R3A 1P6
(204) 774-5501, fax: (204) 772-5083
Contact: Arlene Gibson

New Brunswick

Allergy and Environmental Health Association
(New Brunswick Branch)
35 Shirley Avenue, Moncton, NB E1C 6N3
(506) 855-4990
Contact: Margaret Kelly

Allergy / Asthma Information Association
20 South Road, Doaktown, NB E0C 1G0
(506) 365-4501
Contact: Gloria J. Shanks

New Brunswick Lung Association
Victoria Health Centre, Suite 257
65 Brunswick Street, Fredericton, NB E3B 1G5
(506) 455-8961, fax: (506) 458-2787
Contact: Ken Maybee

Newfoundland

Newfoundland Lung Association
1 Campbell Avenue, St. John's, NF A1E 2Z1
(709) 726-4664, fax: (709) 726-2550
Contact: Peggy Johnson

Nova Scotia

Allergy and Environmental Health Association
(Nova Scotia Branch)
P.O. Box 8212, Station A, Halifax, NS B3K 5L9
(902) 477-5803
Contact: Greg Booth

Nova Scotia Lung Association
17 Alma Crescent, Halifax, NS B3N 3E6
(902) 443-8141, fax: (902) 445-2573
Contact: Bill VanGorder

The Environmental Medicine Clinic
Victoria General Hospital
Bethune Building, Room 519
Halifax, NS B3H 2Y9
(902) 428-7089
Contact: Dr. Roy Fox

Ontario

Allergy and Environmental Health Association
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Glossary of Terms

Acetaldehyde — An aldehyde found in cigarette smoke, vehicle exhaust and smog. It is a metabolic product of Candida albicans and is synthesized from alcohol in the liver.

Additive — A substance added in small amounts to foods to alter the food in some way.

Adrenalin — Trademark for preparations of epinephrine, which is a hormone secreted by the adrenal gland. It is used sublingually and by injection to stop allergic reactions.

Adsorb — Accumulate (a gas, liquid, or dissolved substance) on a porous surface in a condensed layer.

Air extractor — A mechanical device which exhausts air from an area.

Aldehydes — A class of organic compounds obtained by oxidations of alcohols. formaldehyde and acetaldehyde are members of this class of compounds.

Allergenic — Causing or producing an allergic reaction.

Allergens — Substances that cause adverse symptoms, such as pollens; molds; animal danders; food and drink (often those most liked or disliked); or chemicals found in air, water, or food.

Allergic reaction — Adverse, varied symptoms or a group of symptoms, unique to each person, resulting from the body's response to exposure to allergens.

Allergy — Attacks by the immune system on harmless or even useful things entering the body. Abnormal responses to substances usually well-tolerated by most people.

Anaphylactic shock — Occurs as a result of immediate and simultaneous physiologic changes induced by the eliciting, or shocking, dose of an agent at many sites in the body.
or
An infrequent, extreme, and immediate allergic reaction that can cause difficulty in breathing or even death.

Antibody — A protein molecule produced to protect the body. It is made by B-lymphocytes or plasma cells in response to a perceived foreign or abnormal substance or organism.

Antigen — Any substance recognized by the immune system that causes the body to produce antibodies; also refers to a concentrated solution of an allergen.

Antihistamine — A chemical that blocks the action of histamine that is released during an allergic reaction.

Antioxidant — A substance that slows oxidation. In nutrition, substance that prevents damage from free radicals and results in oxygen sparing.

Autoimmune — A condition resulting when the body makes antibodies against its own tissues or fluid. the immune system attacks the body it inhabits, which causes damage or alteration of cell function.

Biochemical Individuality — A distinct cellular makeup that is basic and unique to each person. This determines cellular needs, responses, and metabolism.

Candida Albicans — A genus of yeast-like fungi normally found in the body. It can multiply and cause infections, allergic responses, or toxicity.

Candidiasis — An overgrowth of Candida organisms, which are part of the normal flora of the mouth, skin, intestines, and vagina.

Cerebral Allergy — Mental dysfunction caused by sensitivity to foods, chemicals, inhalants, or toxins in the environment.

Chronic — Of long duration; refers to constant pain, condition, or illness that has been present for a long time.

Cyclic Allergy — A type of allergy which, with abstinence and/or non-exposure, will disappear and will not reappear unless there is an over-exposure to the substance.

Desensitization — The process of building up body tolerance to allergens by the use of extracts of the allergenic substance.

Desorb — Re-emit chemicals or volatile organic compounds.

Die-off — Uncomfortable symptoms caused when cells or organisms rupture and release toxic metabolic products in the body.

Disorder — A disturbance of regular or normal functions.

Eczema — Dry, itchy, noncontagious skin rash frequently caused by allergy.

Edema — Excess fluid accumulation in tissue spaces. May be local or generalized.

Elimination Diet — A diet in which common allergenic foods and those suspected of causing allergic symptoms have been temporarily eliminated.

End Point — The treatment doses as determined by serial dilution titration.

Environment — A total of circumstances and/or surroundings in which an organism exists. May be a combination of internal or external influences that can affect an individual.

Environmental Insult — An exposure to an environmental agent causing a reaction.

Environmental Medicine — A branch of medicine that treats allergies and environmental sensitivities through diet, environmental control and immuno-therapy techniques.

Environmental Medicine Physician — A physician who specializes in the diagnosis, management, and prevention of the disruption of body homeostasis that results from environmental exposures (foods, inhalants, and chemicals). Treatment may include a combination of environmental control, immunotherapy, nutritional supplements, and rotation diet, with minimal use of drugs.

Environmental Sensitivities — A complex set of symptoms caused by adverse reactions of the body to external and internal environments. See also pages 4 and 5 of this report.

Extract— Treatment dilution of an antigen (allergen) used in immunotherapy, such as a food, chemical, or pollen extract.

Fixed Allergy — See Permanent Allergy.

Food Addiction — Similar to drug addiction; the person becomes "hooked" on a particular allergenic food and must keep eating it regularly in order to prevent withdrawal symptoms.

Food Family — A grouping of foods according to their botanical or biological characteristics.

Heat recovery ventilator — A mechanical device which introduces outside air to replace exhausted air and as a conservation measure recovers heat or cold from the exhausted air.

Heparin — A substance released during allergic reactions. Preparations of heparin, in the proper concentrations and administered sublingually, have an anti-inflammatory action.

Histamine — A body substance released by mast cells and basophils during allergic reactions, which precipitates allergic symptoms.

Holistic — Refers to the view that health and wellness depend on a balance among mind, body, emotions, and spirit.

Homeopathic — Refers to giving minute amounts of remedies that in massive doses would produce effects similar to the condition being treated.

Homeostasis — The balance of functions and chemical composition within an organism that results from the actions of regulatory systems.

Hypersensitivity — An acquired reactivity to an antigen that can result in bodily damage upon subsequent exposure to that particular antigen.

Hypoallergenic — Refers to products formulated to contain the fewest possible allergens. Such products are not necessarily safe for everyone.

Immune System — The body's defence system, composed of specialized cells, organs, and body fluids. It has the ability to locate, neutralize, metabolize, and eliminate unwanted or foreign substances.

Immunocompromised — A person whose immune system has been damaged or stressed and is not functioning properly. May or may not be reversible, depending on the extend of the damage.

Immunity — Inherited, acquired, or induced state of being able to resist a particular antigen by producing antibodies to

counteract it; mechanisms that maintain the uniqueness of self.

Inflammation — The reaction of tissues to injury from trauma, infection, or irritating substances. Affected tissue can be hot, reddened, swollen, and/or tender. Oxygen availability may be reduced in these tissues.

Inhalant — Any airborne substance small enough to be inhaled into the lungs; e.g., pollen, dust, mold, and animal danders.

Intolerance — Inability of an organism to endure a substance.

Intradermal — Method of testing in which a measured amount of antigen is injected between the top layers of the skin.

Latent — Concealed or inactive.

Maladaption — An alternative term used to describe sensitivity.

Masking — Suppression of symptoms due to frequent exposure to a substance to which a person is sensitive.

Migraine — A condition marked by recurrent severe headaches on one said of the head, often accompanied by nausea, vomiting, and light aura. These headaches are frequently attributed to food allergy.

Neurotransmitter — A molecule that transmits electrical and/or chemical messages from nerve cell to nerve cell (neuron) or from nerve cells to muscles secretory, or organ cells.

Neurotransmitter — A molecule that transmits electrical and/or chemical messages from nerve cell to nerve cell (neuron) or from nerve cells to muscles, secretory, or organ cells.

Neutralize — To render an allergic reaction inactive. In chemistry, rendering a substance neither acidic nor alkaline.

Neutralizing Dose — The dilution of a particular antigen that gives relief from or prevents allergic symptoms. This treatment does is determined by provocative-neutralization testing.

Off-gas — Emit volatile organic compounds (gases, etc.).

Organic Foods — Foods grown in soil free of chemical fertilizers, and without pesticides, fungicides, or herbicides.

Outgassing — The releasing of volatile chemicals that evaporate slowly and constantly from seemingly stable materials such as plastics, synthetic fibres, or building materials.

Overload — The overpowering of the immune system due either to massive, concurrent exposure or to low-level continuous exposure caused by many stresses, including allergens.

Oxidation — The chemical process by which a substance combines with oxygen and changes to another form. In chemistry, refers to that portion of a chemical reaction in which an electron is lost by an atom or group of atoms.

Permanent Allergy — An allergy to a substance that always provokes symptoms, even after prolonged abstinence.

Postnasal Drip — The leakage of nasal fluids and mucous down into the back of the throat.

Provocative-neutralization — An allergy test that uses an antigen to provoke a reaction and then neutralizes the reaction with a lower or higher dose of the same antigen.

Rotation Diet — A diet in which a particular food and other foods in the same "family" are eaten only once every four to seven days.

Seal (Sealant) — Apply a coating (sealant, such as Crystal Aire or Last & Last) to reduce the emission of gases from an object.

Sensitivity — An adaptive state in which a person develops a group of adverse symptoms to the environment, either internal or external.

Sensitization — The process that leads to the development of allergic symptoms in persons intolerant to a specific substance.

Stress — Anything that places undue strain upon normal body functions. Stress may be internal in origin (disease, malnutrition, dysfunction of a system, or allergic reaction) or external (environmental factors or interpersonal relations).

Sublingual — Under the tongue; method of testing or treatment in which a measured amount of an antigen or extract is

administered under the tongue, behind the teeth. Absorption of material is rapid.

Susceptibility — An alternative term used to describe sensitivity.

Syndrome — A group of symptoms or signs that, occurring together, produce a pattern typical of a particular disorder.

Tolerable — Does not provoke sensitivity reactions.

Tolerance — The capacity of the body to withstand repeated exposures without symptoms.

Tolerated — Does not cause harmful effects.

Tolerated Threshold — The maximum amount of allergens, stress, and exposures that an individual can tolerate without having symptoms.

Toxic — Poisonous.

Universal Reactor — A person who is allergic to or has symptoms from numerous materials.

Urticaria — Allergic hives or welts.

Volatile — Liable to change from a solid or liquid to a gaseous form.

Wheal — A raised bump on the skin surface caused by injection of an antigen between the top layers of skin.

Withdrawal — Short-term, adverse symptoms experienced when a person avoids a substance to which he or she is allergic or addicted.

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Conference Speakers

Sue Baker is an Education Officer in the Special Education Policy Unit of the Ontario Ministry of Education and Training with allergies, sensitivities, asthma and anaphylaxis under her portfolio.

Reg Barsoum is a Project Engineer for The Waterloo County Board of Education and has been instrumental in the development of standards, and in the construction and on-going operation of classrooms for students with sensitivities, and for the first school built especially for students with sensitivities (opening September 1996).

Dr. W. Greg Booth is a dentist who had to retire due to his exposure to chemicals in the workplace. He is Past President of AEHA Nova Scotia, President of AEHA Canada, and serves on the Patient Advocacy Committee for the Environmental Health Clinic in Fall River, NS.

Roy Cooper is married with four daughters, one of whom is learning disabled. He has been involved with the Learning Disabilities Association for 18 years serving at the chapter, provincial and national levels.

K.S. (Ken) Drolet's wife Estelle and daughter Christine both suffer from sensitivities. For the past few years, Ken has been on the Board of Directors of Barrhaven Non-Profit Housing, Incorporated, which includes the one of the first multiple unit non-profit housing for persons with sensitivities.

Dr. Edward Ellis is Associate Medical Officer of Health with the Regional Municipality of Ottawa-Carleton Health Department.

Dr. Frank Foley is the Medical Director of the Environmental Health Clinic and a member of the Department of Family Practice at Women's College Hospital, Toronto.

Elizabeth Hare is active with the Allergy and Environmental Health Association at the branch and national levels. Ms. Hare is co-author of "Accommodating the Needs of Students with Environmental Sensitivities".

Heather Holden has three children with sensitivities, two of whom have learning disabilities. She has been involved with the Learning Disabilities Association at the chapter, provincial and national levels.

Ed Lowans consults on healthy buildings, advanced design and environmental health issues. He is Past President of the Allergy and Environmental Health Association of Canada.

Dr. William J. (Bill) Mahoney represents the Ontario Medical Association on the Ontario Advisory Council on Special Education.

Dr. Lynn Marshall is a physician in the Environmental Health Clinic, Women's College Hospital, and a Research Associate in the University of Toronto Environmental Hypersensitivity Research Unit.

Barbara McElgunn is the Health Liaison Officer for the Learning Disabilities Association of Canada.

Dr. John Molot is a physician who has been working in the field of environmental medicine since 1980. He is Medical Advisor and Chair of the Health Data Working Group for the Federal Task Force on Material Emissions.

Ian C. Morton has been involved in various environmental activities for over 10 years. He is currently Project Director of Environmental Health Programs for the Ontario Lung Association.

John Nelms is an optometrist whose wife Kitty became extremely ill after exposure to pesticides. John and Kitty built one of the first homes designed specifically for persons with sensitivities.

Dr. Doris J. Rapp is a pediatric allergist specializing in environmental medicine and currently lives in Phoenix, Arizona and has written such titles as The Impossible Child.

Leslirae Rotor, MA, MSc, is an economist involved in third-world development work. She is President of AEHA-Ottawa and National Capital Representative for AEHA-Canada. She is also co-author of "Accommodating the Needs of Students with Environmental Sensitivities".

Bruce M. Small, PEng, has done pioneering research on low-indoor-pollution design for the general public, for institutions, and for individuals with sensitivities.

Dr Anna Rose Spina helped facilitate the development of the Environmental Health Clinic at Women's College Hospital, after working on this issue for the Ontario Ministry of Health for twelve years..

Debra Wright is a Senior Advisor with the Research and Housing Innovation Section, Canada Mortgage and Housing Corporation.

June 1996